PRECIOUS METALS MINING

MERCURY AIR EMISSIONS QUESTIONNAIRE

(For Nevada Facilities)

1. Instructions:

We request that this questionnaire is completed for operations that comprise the **"Primary Extraction and Processing of Gold and Silver"** industry at your facility. This sector includes all processes that are part of primary extraction, processing, and production of gold and other products or by-products (such as mercury and silver) including, but not limited to, grinding, leaching, roasting, autoclaving, carbon stripping, carbon regeneration, electrowinning, retorting, smelting and waste disposal. The subject operations are generally conducted under Standard Industrial Classification (SIC) Code 104, Gold and Silver Ores or under North American Industry Classification System (NAICS) Code 21222. We are seeking the information requested by this questionnaire pursuant to Nevada Revised Statutes (NRS) 445B.230, NRS 445B.330 and NRS 445B.340-360.

We are requesting information regarding mercury air emissions from your primary extraction and processing operations, the use of air pollution control (APC) devices in those operations, and their effectiveness in reducing emissions, particularly of mercury emissions. The information requested is described in Sections 2-9 of this questionnaire and in the Annexes.

Please satisfy this request as completely as possible from existing information. No additional monitoring or emission testing is required by your company to respond to this request.

If the information for any particular question is already in your air permit for the facility, or in your air permit application, you do not need to provide that information again in this questionnaire. If this is the case, please write “see permit”, or “see permit application” for the appropriate questions in Sections 2-9 or Annexes.

2. Facility General Information:

a. Plant-specific facility name:

b. Mailing address:

c. Street address or physical location of facility:

d. Longitude and latitude (or UTM coordinates) for primary processing/refinery area:

e. Names and telephone numbers of contact persons who are able to answer technical questions about this questionnaire:

f. Are you a subsidiary or affiliate of another company or other organization? If yes, please provide the name of parent company and/or other organization.

3. Facility Operation Information:

a. Does the facility process mercury-containing ore (i.e., have detectable concentrations of mercury in the ore)? If no, please provide ore characterization data or other evidence supporting this answer.

b. Does the facility process ore containing mercury at concentrations of 0.1 mg mercury per kilogram ore (0.1 mg/kg) or higher? If no, please provide ore characterization data or other evidence supporting this answer.

c. Total quantity (ounces) of precious metals produced in 2004:

   i. Gold

   ii. Silver

   iii. Other

d. Does the facility use thermal operations in its precious metals processing? (Note: Thermal operations include: pre-dryers, drying, roasting, autoclaving, electrowinning, retorting, smelting, carbon regeneration kilns, drying, and any other process that involve units with the potential to emit mercury generated by direct or indirect sources of heat energy.) If yes, proceed to Question 2E. If no, please provide explanation of plant precious metals processing operations with a flow diagram and basis for determination that no thermal processes are used. If no, skip the remaining portions of the questionnaire.

e. Please provide a flow diagram and description of the precious metals processing operations at your facility, with identification on the diagram of where mercury is expected to be present. Include a description of how mercury is typically liberated from the ore and its flow for eventual recovery, release to the atmosphere or deposition in tailings or waste streams.

f. Total tons of ore processed in 2004:

g. If roasting is utilized, total tons of ore roasted in 2004:

   i. Annual operating hours for 2004 for the roaster:

h. If autoclaving is utilized, total tons of ore autoclaved in 2004:

   i. Annual operating hours for 2004 for the autoclave:

i. Please provide the total tons of ore processed in 2004 subject to cyanide leaching (provide quantity by the following categories):

   i. heap leaching

   ii. carbon in leach of milled ore

   iii. carbon in leach of roasted or autoclaved ore

j. Do you produce mercury as a product or byproduct? If yes, please provide amount (pounds) of mercury produced in 2004 by type of product/byproduct produced:

   i. _____ pounds elemental mercury produced

   ii. _____ pounds calomel produced.

k. Please describe your facility's expected number of future years of operation:

4. <u>Emission Unit Identification:</u>

For each thermal operation emission unit with the potential to emit mercury, please complete the questions in Annexes 1 to 7, as applicable and appropriate for your facility. See Annexes 1 to 7.

5. <u>Estimated Total Mercury Emissions From the Facility</u>:

Please provide an estimate of the total actual mercury air emissions (in pounds) released from the entire facility for year 2004 and a description of the basis of such estimate. Please use the following hierarchy of data, for reporting such estimate:

- Direct testing and measurement.
- Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

Total estimated mercury emissions from the facility for year 2004:

_____ pounds

6. Existing Mercury Emissions Control Information:

For each air emissions control device that has some effect on mercury emissions, please complete the questions in Annexes 8 to 12, as applicable and appropriate for your facility. See Annexes 8 to 12.

7. Modifications to Existing Mercury Controls and Additional Mercury Controls:

Please describe any post-2004 modifications to existing mercury controls, additional control measures, improved work place practices, pollution prevention measures, or other actions, if any, that have been installed or implemented in 2005 or are planned by the facility to be installed or implemented within the next 24 months to further reduce mercury emissions:

8. Process Changes:

Please describe any process or equipment changes implemented in 2005, or planned for future years, that could significantly increase the potential for mercury emissions (for example, installing a roaster, carbon kiln, or other thermal process):

9. Permit Conditions and other Commitments/Agreements:

Please provide a summary of air emission permit conditions or provide a copy of your air permit. Also, please provide a summary of any voluntary agreements/commitments, especially with regard to pollution prevention measures, control equipment and emissions levels, and compliance schedules:

ANNEX 1. AUTOCLAVING

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 autoclave, copy this Annex 1 and complete a separate copy for each such unit.)*

   a. Autoclaving process description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from this autoclaving process and the basis of such estimate, in accordance with the following hierarchy of data:

   a. Direct testing and measurement.

   b. Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

   Estimated mercury emissions from autoclave = **_____** pounds for 2004

   Basis of estimate: **_____**

   _____

   _____

3. Circle the code numbers for the type of air pollution control devices and the type of fume capture systems used:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric/cartridge filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Off-gas quencher	**3**	Other: **_____**
4	Electrostatic precipitator		
5	Carbon adsorption unit		
6	Other: **_____**		

4. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

   height: _____ ft

   diameter: _____ ft

   flow rate: _____ acfm

   temperature: _____ EF

5. Describe any work practices or other measures that prevent emissions from autoclaving operations.

_____

_____

6. Have air emission tests been conducted on these autoclaving operations?

   0 No

   1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

7. Additional comments and information:

_____

_____

_____

_____

ANNEX 2. ROASTING OPERATIONS

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 roasting operation, copy this Annex 2 and complete a separate copy).*

   Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

   Estimated mercury emissions from roaster = _____ pounds for 2004.

   Basis of estimate: _____

   _____

   _____

3. Type of fuel used: _____

4. Typical operating temperature: _____ EF

5. Circle the code numbers for the type of air pollution control device and the type of fume capture system used:

APC device: _____		Fume capture system:	
0	No device is used	**0**	None
1	Fabric/cartridge filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Off-gas quencher	**3**	Other: _____
4	Electrostatic precipitator		
5	Carbon adsorption unit		
6	Other: _____		

6. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

height: _____ ft

diameter: _____ ft

flow rate: _____ acfm

temperature: _____ EF

7. Describe any work practices or other measures that prevent emissions from this roasting operation:

_____

_____

8. Have air emission tests been conducted on these roasting operations?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

9. Additional comments and information:

_____

_____

_____

ANNEX 3. CARBON REGENERATION KILN

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 carbon regeneration kiln, copy this Annex 3 and complete a separate copy for each such unit).*

   a. Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

     Estimated mercury emissions from carbon regeneration kiln = _____ pounds for 2004.

     Basis of estimate: _____

     _____

     _____

3. Identify the type of regeneration process used.

   _____

   _____

4. Circle the code numbers for the type of air pollution control device and the type of fume capture system used:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Selenium filter	**3**	Other: _____
4	Carbon adsorption unit		
5	Other: _____		

5. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

height: _____ ft

diameter: _____ ft

flow rate: _____ acfm

temperature: _____ EF

6. Describe any work practices or other measures that prevent emissions from this carbon regeneration operation:

_____

_____

7. Have air emission tests been conducted on these carbon regeneration operations?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

8. Additional comments and information: _____

_____

_____

ANNEX 4. ELECTROWINNING

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 electrowinning process, copy this Annex 4 and complete a separate copy for each such unit.)*

   a. Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

     Estimated mercury emissions from electrowinning unit = _____ pounds for 2004.

     Basis of estimate: _____

     _____

     _____

3. Circle the code numbers for the type of air pollution control device and the type of fume capture system used:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

4. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

   height: _____ ft

   diameter: _____ ft

   flow rate: _____ acfm

   temperature: _____ EF

5. Describe any work practices or other measures that prevent emissions from this electrowinning operation:

   _____

   _____

6. Have air emission tests been conducted on these electrowinning operations?

   0 No

   1 Yes [Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.]

9. Additional comments and information: _____

   _____

   _____

ANNEX 5. RETORT

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 retort process, copy this Annex 5 and complete a separate copy for each such unit).*

   a. Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

     Estimated mercury emissions from retort = _____ pounds for 2004

     Basis of estimate: _____

     _____

     _____

3. Do you recover mercury? _____

4. Is it processed further onsite? _____

5. Circle the code numbers for the type of air pollution control device and the type of fume capture system used:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

6. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

height: _____ ft

diameter: _____ ft

flow rate: _____ acfm

temperature: _____ EF

7. Describe any work practices or other measures that prevent emissions from this retort operation.

_____

_____

8. Have air emission tests been conducted on these retort operations?

0 No

1 Yes [Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.]

9. Additional comments and information: _____

_____

_____

ANNEX 6. SMELTING FURNACE

1. Please provide an identification of each such unit, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 smelting furnace, copy this Annex 6 and complete a separate copy for each such unit.)*

   a. Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

     Estimated mercury emissions from furnace = _____ pounds for 2004

     Basis of estimate: _____

     _____

     _____

3. Circle the code number for furnace application:

   1 Melting **2** Holding

4. Capacity of furnace: _____ tons per hour

5. Circle the code number(s) for materials added for smelting:

   1 Lime
   2 Fluxing materials (e.g., magnesium chloride, calcium chloride, etc.)
   3 Inhibitive gases
   4 Alloying agents (describe): _____
   5 Other (describe): _____

6. Circle the code which describes how molten material is transferred to molds for casting:

1 Hand ladling
2 Pumping
3 Tilt pouring
4 Other (describe): _____

7. For charging, melting, and tapping operations associated with this furnace, circle the code numbers for the types of air pollution control devices and fume capture systems used.

Charging:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

Melting:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

Tapping:

APC device:		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

8. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

height: _____ ft

diameter: _____ ft

flow rate: _____ acfm

temperature: _____ EF

9. Describe any work practices or other measures that prevent emissions from this furnace operation:

_____

_____

10. Have air emission tests have been conducted on this furnace?

0 No

1 Yes [Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.]

11. Additional comments and information:

_____

_____

ANNEX 7. OTHER THERMAL PROCESS UNITS

1. Please provide an identification of other thermal process units, including a process description and the mechanism by which mercury emissions are released. *(Note: if facility has more than 1 "other thermal process" process, copy this Annex 7 and complete a separate copy for each such unit.)*

   a. Description: _____

   _____

   _____

2. An estimate of the actual mercury air emissions released from such unit and the basis of such estimate, in accordance with the following hierarchy of data:

   - Direct testing and measurement.
   - Based on engineering calculations that take into account the average mercury content of the ore processed, the amount of ore processed and the potential for mercury releases from the specific processes utilized to recover gold.

     Estimated mercury emissions from unit = _____ pounds for 2004

     Basis of estimate: _____

     _____

     _____

3. Circle the code numbers for the type of air pollution control device and the type of fume capture system used:

APC device ID no.: _____		Fume capture system:	
0	No device is used	**0**	None
1	Fabric filter	**1**	Side-draft or canopy hood
2	Wet scrubber	**2**	Close-fitting hood or direct process vent
3	Carbon adsorption unit	**3**	Other: _____
4	Other: _____		

4. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

   height: _____ ft

   diameter: _____ ft

   flow rate: _____ acfm

   temperature: _____ EF

5. Describe any work practices or other measures that prevent emissions from this operation:

   _____

   _____

6. Have air emission tests been conducted on these retort operations?

   0 No

   1 Yes [Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.]

7. Additional comments and information:

   _____

   _____

ANNEX 8. FABRIC FILTER DESCRIPTION

1. Please describe the fabric filters including an explanation of the mechanism for mercury removal (for example physical or chemical adsorption). *(Note: if facility has more than 1 fabric filter, copy this Annex 8 and complete a separate copy for each fabric filter.)*

   Device description: _____

   _____

   _____

2. Year installed/rebuilt: _____/_____

3. The estimated control efficiency with an explanation as to how that was calculated:

   _____

   _____

   _____

4. Describe the chemical and physical form of the mercury generated by the control (for example, elemental mercury, calomel scrubber solution, carbon loaded with mercury, etc.) and the handling, storage and disposition of same:

   _____

   _____

   _____

5. Circle the code number for device type:

   1 Fabric filter **2** Cartridge collector

6. Circle the code number for pressure mode of operation:

   1 Positive pressure **2** Negative pressure

7. Circle the code number for bag cleaning method:

1 Pulse jet
2 Shaker
3 Reverse air
4 Other (describe):

8. Circle the code number for bag cleaning mode:

1 On line **2** Off line

9. Cloth type:

10. Number of compartments:

11. Gas inlet temperature: _____ EF

12. Gas flow rate: _____ acfm

13. Gross filtering area: _____ sq.ft.

14. Net filtering area: _____ sq.ft.

15. Air to cloth ratio: _____ fpm

16. Referring to the processes described in Annexes 1 through 7, identify each process served by this device.

Annex No.	Process Description	Operation

17. Amount of particulate matter collected by this device:

A. Tons of dust material collected: _____ tons

B. Time period for which dust material was collected: _____ hours of operation

C. Amount of metal or material processed or treated: _____ tons

18. Has this material been analyzed?

0 No **1** Yes **[Enclose analysis (but not TCLP data).]**

19. Have emission tests been conducted on this device?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

20. Additional comments and information:

_____

_____

ANNEX 9. WET SCRUBBER DESCRIPTION

1. Please describe the wet scrubber system including an explanation of the mechanism for mercury removal (for example physical or chemical adsorption). *(Note: if facility has more than 1 wet scrubber, copy this Annex 9 complete a separate copy for each.)*

   Device description: _____

   _____

   _____

2. Year installed/rebuilt: _____/_____

3. a.) Estimated control efficiency _____

   b.) Basis of estimated control efficiency (circle appropriate code number):

   1 Performance source test
   2 Vendor performance guarantee
   3 Engineering design efficiency
   4 Other (specify): _____

4. What is the chemical and physical form of the mercury generated by the control (circle all that apply)?

   1 Elemental mercury
   2 Calomel scrubber solution (mercurous chloride; Hg_2Cl_2)
   3 Hypochlorite scrubber solution
   4 Carbon loaded with mercury
   5 Other (specify): _____

5. Specify the handling, storage and disposition of mercury generated from Item 4; if multiple forms/dispositions are used, indicate the approximate percent of total mercury generated attributable to each?

   1 Elemental mercury collected in containers and sold off-site
   2 Scrubber solution sent to tailings pond
   3 Scrubber solution regenerated; mercury precipitated as solid; sent off-site for land disposal
   4 Scrubber solution regenerated; mercury precipitated as solid; sent to on-site landfill
   5 Mercury remaining on processed ore; disposed of in tailings pond
   6 Other (specify): _____

6. Circle the code number for scrubber type:

1 Venturi
2 Mercurous Chloride Scrubber
3 Vertical packed bed
4 Horizontal packed bed
5 Tray Tower
6 Spray Chamber
7 Other (specify):

7. Circle the code number for pressure mode of operation:

1 Positive pressure **2** Negative pressure

8. Gas flow rate: _____ acfm

9. Typical gas inlet temperature: _____ EF

10. Typical gas outlet temperature: _____ EF

11. Pressure drop: _____ inches water column

12. Liquid to gas ratio: _____ gallons per 1,000 acf

13. Chemical usage rate (specify chemical and typical usage rate):

Chemical Added	Usage Rate	Units for Usage Rate

14. Referring to the processes described in Annexes 1 through 7, identify each process served by this device.

Annex No.	Process Description	Operation

15. Have emission tests been conducted on this device?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

16. Additional comments and information:

_____

_____

ANNEX 10. ELECTROSTATIC PRECIPITATOR (ESP) DESCRIPTION

1. Please describe the ESP system including an explanation of the mechanism for mercury removal (for example physical or chemical adsorption). *(Note: if facility has more than 1 ESP, copy this Annex 10 and complete a separate copy for each.)*

   Device description: _____

   _____

   _____

2. Year installed/rebuilt: _____/_____

3. The estimated control efficiency with an explanation as to how that was calculated:

   _____

   _____

   _____

4. The chemical and physical form of the mercury generated by the control (for example, elemental mercury, calomel scrubber solution, carbon loaded with mercury, etc.) and the handling, storage and disposition of same:

   _____

   _____

   _____

5. Circle the code number for the device type:

   1 High-voltage, single-stage **2** Low-voltage, two-stage

6. Collection plate surface area: _____

7. Gas inlet temperature: _____ EF

8. Voltage: _____ kV

9. Gas inlet flow rate: _____ acfm

10. Pressure drop: _____ inches H_2O

11. Referring to the processes described in Annexes 1 through 7, identify each process served by this device.

Annex No.	Process Description	Operation

12. Have emission tests been conducted on this device?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

13. Additional comments and information:

_____

_____

ANNEX 11. CARBON ADSORPTION UNITS

1. Please describe the carbon adsorption units including an explanation of the mechanism for mercury removal (for example physical or chemical adsorption). *(Note: if facility has more than 1 carbon adsorption unit, copy this Annex 11 and complete a separate copy for each such unit.)*

   Device description:

   _____

   _____

   _____

2. Year installed/rebuilt: _____/_____

3. The estimated control efficiency with an explanation as to how that was calculated:

4. The chemical and physical form of the mercury generated by the control (for example, elemental mercury, calomel scrubber solution, carbon loaded with mercury, etc.) and the handling, storage and disposition of same:

5. Circle the code for the type of stream treated:

   1 Gaseous **2** Aqueous/liquid

6. Flow rate: _____ acfm or gallons/min (circle appropriate units)

7. Inlet temperature: _____ EF

8. Circle the code for the type of carbon adsorption system:

   1 Canisters (nonregenerative)

   2 Regenerative

   3 Other (specify): _____

9. Total number of beds in system: _____

10. Total number of beds used (actively adsorbing) in parallel at any given time: _____

11. Total number of beds used in series: _____

12. Carbon bed dimensions (in feet):

    length: _____

    width: _____

13. Superficial carbon bed velocity: _____

14. Adsorbtion bed temperature (if different than inlet): _____ EF

15. Mass of carbon per bed: _____ lbs

16. Type of carbon used: _____

17. Disposition of carbon:

    1 Regenerated on-site:

    a steam

    b chemical

    c other: _____

    2 Reactivated by carbon supplier

    3 Land disposed

    4 Incinerated

    5 Other: _____

18. For your regenerable systems:

    Method of carbon regeneration:

    1 steam

    2 chemical leaching

    3 other: _____

    Length of the adsorbtion cycle: _____

    Length of desorption cycle: _____

    Number of beds desorbing at one time: _____

19. Method of monitoring breakthrough:

1 Monitor for mercury at system outlet

2 Monitor for mercury within adsorption bed near outlet

3 Monitor for mercury outlet of first bed in a system with beds in series

4 Do not monitor/replace beds at fixed intervals

Replacement frequency _____ months

5 Do not monitor/replace beds at fixed volume of gas processed

Gas processing set point _____ scf/bed

6 Other: _____

20. If monitoring mercury breakthrough**:**

Sampling and Analytic method used:

1 EPA Method 29

2 EPA Method 101, 101A, 102, 105

3 Ontario Hydro Method

4 Other atomic adsorption spectroscopy method: _____

5 Other: _____

Frequency of monitoring:

1 Continuous (sample at least once every 15 minutes)

2 Periodic _____ times per month

21. Referring to the processes described in Annexes 1 through 7, identify each process served by this device.

Annex No.	Process Description	Operation

22. Have emission tests been conducted on this device?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

23. Additional comments and information:

_____

_____

ANNEX 12. OTHER AIR POLLUTION CONTROL (APC) DEVICE DESCRIPTION

1. Please describe the other APC devices (such as condensers, or other controls) including an explanation of the mechanism for mercury removal (for example physical or chemical adsorption). *(Note: if facility has more than 1 "other APC device", copy this Annex 12 and complete a separate copy for each such device.)*

   Device description:

   _____

   _____

   _____

2. Year installed/rebuilt: _____/_____

3. The estimated control efficiency with an explanation as to how that was calculated:

4. The chemical and physical form of the mercury generated by the control (for example, elemental mercury, calomel scrubber solution, carbon loaded with mercury, etc.) and the handling, storage and disposition of same:

5. Relevant design and operating data (e.g., refrigerated non-contact water-cooled condenser; water recirculation set to achieve outlet gas temperature of _____ EF):

   _____

   _____

   _____

6. Exit Exhaust Vent (or Stack) Parameters (for gaseous streams):

height: _____ ft

diameter: _____ ft

flow rate: _____ acfm

temperature: _____ EF

7. Referring to the processes described in Annexes 1 through 7, identify each process served by this device.

Annex No.	Process Description	Operation

8. Have emission tests been conducted on this device?

0 No

1 Yes **[**Enclose summary measurement data, including data on mercury speciation, if available, the test methods used, information on actual production or processing rates and on process conditions at the time the measurements were made, and a statement that any APC devices (if present) were operating normally during the test, or if not, what the abnormal operating conditions were.**]**

9. Additional comments and information:

_____

_____

ANNEX 13. MERCURY CONTROL DEVICE COST INFORMATION

1. Do you have recent (within the last 10 years) cost data for a control device described in a prior Annex?

   0 No

   1 Yes **[**If this control was installed specifically to reduce mercury emissions or produces a mercury product/byproduct, please complete this for the control device.**]**

2. Mercury control device description for which costs are provided. *(Note: if cost information is available for more than 1 control device, copy this Annex 13 and complete a separate copy for each such unit)*

   _____

   _____

   Annex Number in which this control device was described: _____

3. Please provide available cost information for this control device and its basis. Engineering estimates and vendor quotes are acceptable. Where available, please provide the cost breakdown. If only total costs are available, indicate which costs are "Included in Total" (to the best of your knowledge) by placing a check in the appropriate box. If a given cost item is unavailable or not included, place a check under "Not known."

   Basis of costs provided: _____

Cost Item Description	Cost ($)	Year of Cost	Included in Total	Not Known
1. Total Installed Cost of APCD				
a. Cost of APCD equipment				
b. Cost of auxiliary equipment[1]				
c. Cost of monitoring/instrumentation				
d. Direct installation costs[2]				
e. Indirect installation costs[3]				
2. Annual O&M Cost for APCD[4]				
a. Operating labor				
b. Maintenance labor				
c. Utilities (electric, water, natural gas)				
d. Waste disposal				
e. Monitoring, recordkeeping & reporting				
f. Indirect annual costs[4,5]				

[1]Auxiliary equipment includes: fan, pumps, motors, duct work, stack
[2]Direct installation costs include: foundation, supports, installation, electrical, piping
[3]Indirect installation costs include: engineering selection, start-up, testing, contingencies
[4]Do **not** include capital recovery in the annual operating and maintenance (O&M) costs
[5]Indirect annual costs include: overhead, administration, taxes, and insurance.